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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,308	04/06/2006	Uwe Schon	B1180/20053	7160

3000 7590 11/17/2008

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EXAMINER	
RAHIM, AZIM	

ART UNIT	PAPER NUMBER
3744	

NOTIFICATION DATE	DELIVERY MODE
11/17/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@crbcp.com

Office Action Summary	Application No.	Applicant(s)	
	10/595,308	SCHON ET AL.	
	Examiner	Art Unit	
	AZIM RAHIM	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *30-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *30-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/17/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 30-58 are objected to because of the following informalities: In claim 30, line 5 and claim 52, line 7, the recitation "a chamber temperature in the cooling chamber" should be changed to recite --the temperature in the cooling chamber-- in order to establish proper antecedent basis in the claims. In claim 39, line 3, the recitation "the temperature courses" should be changed to recite --temperature courses-- in order to provide proper antecedent basis to this recitation Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 30-33, 37, 38, 41, 42, 44-49, 52, 53 and 56-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas (US 6,389,828) in view of Boese (US 4,566,283).

Regarding claim 30, 38 and 52, Thomas teaches cooling equipment (500) and operating method comprising: a) a liquid nitrogen [column 2, line 59] supply line [line that extends from cryogen supply tank 506 to chamber 503] for supplying a cooling agent (509) to a cooling chamber (503) [illustrated in figure 11];; c) a first temperature sensor (550) for measuring the temperature in the cooling chamber [illustrated in figure 11]; and e) a controller (553) for temperature control [via the controller's connection to temperature sensor 550], wherein the controller: (i) is adapted to detect several temperatures as control variables [column 10, lines 49-55; i.e. multiple temperature values]; (ii) is a multiple controller [as illustrated in figure 1, controller 553 is connected to several output components such as blower 512, temperature sensor 550 and valve 556]; and (iii) adjusts several heating performances as manipulated variables [column 10, lines 57-61; i.e. multiples stages of heating].

Thomas fails to teach a heater with an adjustable first heating performance for heating the cooling agent supplied to the cooling chamber a second temperature sensor for measuring an agent temperature of the cooling agent supplied to the cooling chamber.

Boese teaches a liquid nitrogen supply tank [see figure 1] for cooling small samples [see column 1, lines 7 and 8] that comprises a liquid nitrogen supply line (11) containing a heater (9) and a thermocouple (10) therein [illustrated in figure 1]. It is noted that the Examiner has interpreted the first heating performance as the amount of heat that heater 9 puts out, thus it is factual that heater 9 puts out heat.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas to include the heater disposed inside the cooling supply line as taught by Boese in order to provide fine control of the cooling agent being supplied, thus enabling more of a variety of substances to be cooled.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas to include the temperature sensor being disposed inside of the cooling supply line as taught by Boese in order to vary the temperature of the cooling agent supplied to the chamber, thus increasing overall system efficiency. It is noted that since controller 553 of Thomas is connected to multiple components, the controller is capable of controlling multiple temperature sensors.

Regarding claim 31, Thomas teaches that the cooling agent supply line is connected to a cooling agent storage container [506] in which the cooling agent is located [column 10, line 29].

Regarding claim 32, Thomas teaches an evaporator [547] with an adjustable second heating performance for evaporating the cooling agent present in the cooling agent storage container [column 6, lines 56-61]. It is noted that the Examiner has interpreted the second heating performance as the amount of heat that heater 547 puts out, thus it is factual that heater 547 puts out heat.

Regarding claim 33, Thomas as modified by Boese teach all the limitations of the claimed invention, and Thomas further teaches that the controller is connected on an input side to

the first temperature sensor [column 10. lines 51-35] and to the second temperature sensor and on an output side to the heater and to the evaporator [column 10, lines 57-61]. It is noted that since the second temperature sensor and heater of Boese has been modified to be connected to the controller of Thomas, the temperature information from the second temperature sensor can be transmitted to the controller and the controller can control the heater.

Regarding claim 37, Boese teaches the heater is integrated in the cooling agent supply line [illustrated in figure 1].

Regarding claim 41, Thomas teaches that the cooling agent supply line is adapted to empty laterally into the cooling chamber [as illustrated in figure 11, the cryogen 509 is emptied laterally toward the wall that is disposed opposite to the wall where the cryogen is supplied].

Regarding claim 42, Thomas teaches that the cooling agent supply line is adapted to empty into the cooling chamber only on one side of the cooling chamber [illustrated in figure 11].

Regarding claim 44, Thomas teaches that the cooling chamber is closed [as illustrated in figure 11, chamber 503 is closed on two sides].

Regarding claim 45, Thomas teaches that the cooling chamber is open on its bottom [as illustrated in figure 11, chamber 503 is open on its left side where an arrow is disposed between heater 509 and temperature sensor 550].

Regarding claim 46, Thomas teaches that the cooling chamber is portable [given the proper transport equipment, the whole of the cooling equipment can be transported].

Regarding claim 47, Thomas teaches that the first temperature sensor is arranged inside the cooling chamber and at an interval from a wall of the cooling chamber [as illustrated in figure 11, temperature sensor 550 is disposed at a distance from the wall that the cryogen is injected].

Regarding claim 48, Thomas teaches that the first temperature sensor is fastened to the cooling chamber by holding equipment extending into the cooling chamber [as illustrated in figure 11, it is factual that temperature sensor 550 as to be mounted to the chamber in order for the sensor to be rigidly positioned therein].

Regarding claim 49, Thomas teaches that the first temperature sensor is attached to holder [the wall where temperature sensor 550 is disposed].

Regarding claim 53, Thomas as modified by Boese teaches all the limitations of the claimed invention, and Thomas further teaches the step of: f) evaporating the liquid cooling agent in a cooling agent storage container (503) with an adjustable second heating performance

to provide an evaporated cooling agent [column 10, lines 57-61]. Boese further teaches the step of g) heating the evaporated cooling agent prior to the introducing step with the adjustable first heating performance [column 1, lines 52-54]; and h) multiple controlling of the first heating performance and of the second heating performance [since controller 553 of Thomas is connected to multiple components as illustrated in figure 11, the controller is capable of receiving data from multiple temperature sensors to control the heater of Boese and the evaporator of Thomas].

Regarding claim 56 and 57, Thomas teaches the controlling of the agent temperature of the cooling agent entering into the cooling chamber in accordance with a target value set for the cooling chamber by adjusting the first heating performance [column 10, lines 49-55].

Regarding claim 58, Thomas teaches a method of cryopreserving a biological sample [i.e. food] comprising cooling the biological sample in the cooling equipment [see abstract, lines 1-6] according to Claim 30.

5. Claims 34, 35 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas as modified by Boese as applied to claims 30, 32 and 52 above, and further in view of Ritter (US 3,245,248).

Regarding claims 34, 35 and 54, Thomas as modified by Boese teach all the limitations of the claimed invention, and Thomas further teaches the multiple controlling of the first heating

performance and of the second heating performance as a function of the different temperatures inside the cooling chamber [since controller 553 of Thomas is connected to multiple components as illustrated in figure 11, the controller is capable of receiving data from multiple temperature sensors to control the heater of Boese and the evaporator of Thomas].

Thomas as modified by Boese fail to explicitly teach that several temperature sensors connected to the controller are provided for measuring the chamber temperature in the cooling chamber, and wherein the temperature sensors are arranged in a spatially distributed manner for measuring a spatial distribution of temperature.

Ritter teaches a cryogenic temperature control apparatus [figure 1] that includes a controller (12) that is integrally connected to two temperature sensors (thermometers 21 and 15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese to include the multiple temperature sensors as taught by Ritter in order to record the temperature distribution within the chamber, thus enabling the controller to adjust the temperature accordingly.

6. Claim 36 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas as modified by Boese and Ritter as applied to claims 34 and 52 above, and further in view of Sitte et al. (US 6,178,757).

Regarding claims 36 and 55, Thomas as modified by Boese teach all the limitations of the claimed invention, and Thomas further teaches the measuring of temperature using a

thermocouple [column 6, lines 49 and 50]; the multiple controlling of the first heating performance and of the second heating performance as a function of the different temperatures inside the cooling chamber [since controller 553 of Thomas is connected to multiple components as illustrated in figure 11, the controller is capable of receiving data from multiple temperature sensors to control the heater of Boese and the evaporator of Thomas]; and measuring with a thermocouple the chamber temperature and the agent temperature prior to the introducing step [column 10, lines 49-55].

Thomas as modified by Boese and Ritter fail to teach that at least one of the temperature sensors is a temperature-dependent electrical resistor.

Sitte et al. teach a cooling chamber temperature control device that utilizes a platinum resistor temperature sensor to measure the temperature of a specimen [column 1, lines 38-42].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese and Ritter to include the use of a temperature dependant electrical resistor as taught by Sitte et al. in order to effectively measure a wide range of temperatures, thus increasing the accuracy of temperature measurement.

7. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas as modified by Boese as applied to claims 30 above, and further in view of Hammerstedt et al. (US 6,065,294).

Regarding claim 39, Thomas as modified by Boese teach all the limitations of the claimed invention, but fails to explicitly teach that the first temperature sensor and the second temperature sensor are connected to storage equipment that stores the temperature courses.

Hammerstedt et al. teach a system to facilitate cryoperservation that includes a controller (48) that includes a microprocessor (64) that stores temperature data that is stored in memory for intervals of time [see figure 4 and column 5, lines 18-25].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese to include a memory that stores temperature courses as taught by Hammerstedt et al. in order to control the temperature of the chamber based on past temperature trends, thus increasing the overall efficiency of the system.

8. Claims 40 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas as modified by Boese as applied to claims 30 above, and further in view of Lee (US 5,335,503).

Regarding claim 40, Thomas as modified by Boese teach all the limitations of the claimed invention, bur fail to explicitly teach that the cooling agent supply line is adapted to empty via a diffuser into the cooling chamber.

Lee teaches an apparatus that cools a heat load in a pressure vessel [see abstract, lines 1-7 and figure 1] that utilizes a diffuser (36) to inject the cryogen into the chamber [illustrated in figure 1].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese to include the diffuser as taught by Lee in order to evenly distribute the cryogen inside the chamber, thus increasing cooling efficiency.

Regarding claim 43, Thomas as modified by Boese teach all the limitations of the claimed invention, but fail to explicitly teach that the cooling agent supply line is adapted to empty into the cooling chamber at the top of the cooling chamber.

Lee teaches an apparatus that cools a heat load in a pressure vessel [see abstract, lines 1-7 and figure 1] that injects the cryogen from the top of the chamber [illustrated in figure 1].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese to include a cooling agent supply line is adapted to empty into the cooling chamber at the top of the cooling chamber as taught by Lee in order to prevent waste of the cryogen that is fed from a top of a supply tank, thus reducing operating costs.

9. Claims 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thomas as modified by Boese as applied to claims 30 above, and further in view of Bash et al. (US 7,031,154).

Regarding claims 50 and 51, Thomas as modified by Boese teach all the limitations of the claimed invention, but fail to teach that the first temperature sensor is connected to a transponder that transmits a measured temperature in a wireless manner to the control device; and wherein

the transponder is selected from the group consisting of a radio transponder, an ultrasonic transponder, an optical transponder and an infrared transponder.

Bash et al. teach the well known concept of providing temperature sensors (122 and 124) in a cooling system that communicates with a controller (104) through wireless shortwave radio communication [column 9, lines 1-10].

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the cooling equipment of Thomas as modified by Boese to include the transmitting of temperature data wirelessly to a controller as taught by Bash et al. in order to eliminate the use of wires, thus reducing operating costs..

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AZIM RAHIM whose telephone number is (571) 270-1998. The examiner can normally be reached on Monday - Thursday 7am - 3pm EST and Friday 7am - 9:30am EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. R./
Examiner, Art Unit 3744
10/7/2008

/Frantz F. Jules/
Supervisory Patent Examiner, Art Unit 3744